

Claims

1. An electrically controlled device for injecting or infusing medical preparations in the human body in which device the controlling is performed by a sealed electric circuit receiving signals from sensors which monitors selected parameters describing conditions of the device, characterised in that the sensors are integrated in a sealed circuit block and are of a kind with no mechanically opened or closed switches.

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2. An electrically controlled device according to claim 1, characterised in that the sealed circuit block, a power supply for this circuit block and other electric components connected to said sealed circuit block are accommodated in one rigid part of the device.

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3. An electrically controlled device according to claim 2 characterised in that said rigid part of the device is a dose setting and injection button.

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4. A device according to claim 1, 2 or 3, characterised in that at least one sensor is a Hall element.

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5. A device according to claim 4, characterised in that the Hall element is signalled by a movable magnet fixed to a part of the device to monitor the position of this part relative to the part accommodating the sealed electric circuit block.

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6. A device according to claim 4 or 5, characterised in that the sealed electronic circuit block comprises a timer and has a first input for a reset signal, a second input for a signal activating a read out of the electronic circuit, and an output to a display displaying the read out of the time lapsed after the latest receipt of a signal on said first input, the sealed circuit further being provided with a sensor connected to said first input, which sensor gives off a signal when the injection button is pressed to move the piston rod, and with a means for optional sending of a signal to the second input to activate the read out of the electronic circuit.

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7. A device according to claim 6, characterised in that the sealed electronic circuit is so designed that a signal sent to the second input opens the energizing of the Hall element and other energy consuming sensors.

Annealed
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8. A device according to claim 6 or 7, characterised in that the Hall element is designed to send a signal to the first input when it detects a change of the position of the magnet relative to the part accommodating the sealed electric circuit.

5 9. A device according to claim 6, 7 or 8, characterised in that the means optionally sending the second signal is a switch outside the sealed circuit block.

10 10. A device according to anyone of the previous claims 5 – 9, characterised in that the magnet has the shape of a magnet ring presenting a sinus shaped magnetic field along the perimeter.

11. A device according to claim 10 characterised in that a number of Hall elements is provided, which Hall elements are positioned along a circle arc which follows a section of said magnet ring.

12 A device according to claim 11 characterised in that four Hall elements are provided

13 A device according to claim 12 characterised in that the said arc of a circle corresponds to 1,5 times the arc between two poles and that a first and a fourth Hall element are positioned at opposite ends of the arc and a second and a third Hall element are positioned between the ends of the arc so that the four Hall elements are placed with equidistant spaces along said arc of a circle.

14. A device according to anyone of the claims 10 – 13 characterised in that the number of poles is 12 and the length of the circular arc is 45°.

15. A device according to claim 13 and 14 characterised in that outputs from the first and the third Hall element are connected to input terminals on a first differential operational amplifier and the outputs from the second and the fourth Hall elements are connected to input terminals on a second differential operational amplifier, and output signals from the differential operational amplifiers are through analogue/digital converters and a normalising circuit lead to a look up table circuit wherein one signal is divided with the other to obtain a tangent function which is used as entrance to a table.